REMARKS

Claim 1-32 are pending, with claims 1-20 and 28 rejected, claims 26-32 objected to, and claims 21-25 withdrawn from consideration. Applicant thanks the Examiner for the indication of allowable subject matter in claims 26-32. Applicant also thanks the Examiner for the Interview conducted on May 17, 2005. The substance of the Interview is reflected in the Remarks below.

Claims 12-20 and 28 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner asserts in the Office Action that it is "unclear from the specification and drawings in figures 8-9 how the hand piece phase difference between the voltage and the current is less that a predetermined value. Further, Applicant fails to disclose any criticality of the exact value of the voltage and the current of the hand piece." During the Interview the Examiner explained that he is unclear as to what specifically is meant by the term "predetermined value." Applicant explained that the "predetermined value" is an application-dependent parameter, and one of ordinary skill would know how to set this parameter for a given application. Applicant also referred the Examiner to page 16, lines 12 et seq. of the specification, where an example predetermined value is 89.5°. The Examiner seemed to accept Applicant's explanation, and requested that Applicant provide it in the Response.

The Examiner also alleges that "it is unclear how the frequency is greater than a pre-set frequency and a number of impedance measurements are greater than a pre-defined number and if the result of the determining step is positive and how it relates to the method for determining temperature of a transducer of an ultrasonic hand piece." During the Interview the Examiner explained that he is unclear as to what specifically is meant by the terms "pre-set" and "pre-defined." Applicant explained that these terms are similar to "predetermined value" in that they are application-dependent parameters, and one of ordinary skill would know how to set these parameters for a given application. Applicant refers the Examiner to page 16, lines 24 et seq. where an example of the pre-set frequency is 44.5 kHz and an example of the pre-defined number is 100.

The Examiner also asserts that claim 28 is dependent on a withdrawn claim. Applicant agrees and has therefore amended claim 28 to depend on claim 1.

The Examiner has maintained each of the prior art rejections from the previous Office Action. That is, the Examiner has maintained the following rejections: (1) claims 1-5 and 7-10 under 35 U.S.C. § 102(b) as being anticipated by Sherman et al. (U.S. Patent No. 5,735,280); (2) claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Sherman et al.; and (3) claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Sherman et al. in view of Benndorf et al. (U.S. Patent No. 4,689,515).

Applicant conducted Interviews with the Examiner's Supervisor, Anh Tuan Nguyen, on May 19 and June 8, 2005. During these Interviews, Applicant asserted the arguments set forth in the previous Response. The Supervisor stated that he agreed with Applicant's position and requested Applicant to file a request for reconsideration in order to "stop the clock." The pending prior art rejections will then be withdrawn and a new prior art search conducted. Applicant is very appreciative of the Supervisor's efforts in advancing prosecution of this application. For the Examiner's and the Supervisor's convenience, the reasons the claims distinguish over the applied prior art are repeated below.

As described in the background section of the application, traditionally, thermocouples, thermistors and other classical temperature sensors were used to measure the transducer temperature. These traditional methods increase the cost of the hand piece, and add additional wires and connections which could potentially reduce the reliability of the ultrasonic surgical system.

The present invention overcomes the problems of the traditional methods of determining transducer temperature by first determining a shunt capacitance of an ultrasonic transducer, and then using the shunt capacitance to determine the temperature. Additionally, if the temperature or rate of change of the temperature of the transducer is excessive, a warning is provided to the user of the transducer.

Sherman et al. is directed to the transfer of energy from an ultrasonic device having a catheter to biological tissue. A temperature sensor, which is mounted in the distal end of the catheter, senses temperature and provides a temperature sensing signal. (Col. 3, lines 54-62.) When

the temperature goes above a predetermined threshold, a processor decreases a power drive level. (Col. 4, lines 13-16.) The temperature sensor 28, which may be a thermocouple 33, is shown in Figs. 2 and 3. (See col. 6, lines 15-16 and 41-42.)

Sherman et al. does not teach, or even suggest, determining a shunt capacitance of the transducer, or calculating the temperature of the transducer based on the shunt capacitance of the transducer, as required by the claims of the present invention. Sherman et al. senses temperature using traditional temperature sensors such as thermocouples. Thus, Sherman et al. is more like the traditional methods described in the background section of the application than like the present invention.

Contrary to the Examiner's position, cols. 15 and 16 of Sherman et al. do not teach determining temperature based on a capacitance of the transducer. The transducer and device are designed to resonate at a certain frequency. Sherman et al. describes sweeping through a frequency range in order to identify resonant frequencies of the transducer. This frequency sweep does not relate to measuring any capacitance or determining temperature. Thus the claims are patentable over Sherman for at least this reason.

Further, Sherman et al. does not teach or suggest providing a warning to a user of the hand piece if one of the temperature of the transducer and a rate of change of the temperature is excessive. Rather in Sherman et al., when the temperature goes above a predetermined threshold, a processor decreases a power drive level. The claims are therefore patentable over Sherman et al. for this additional reason.

Many of the dependent claims recite additional features of determining the shunt capacitance of the transducer, and/or of calculating the temperature of the transducer based on the shunt capacitance. Since Sherman et al. does not teach or suggest determining the shunt capacitance or calculating the temperature of the transducer based on the shunt capacitance, it necessarily follows that Sherman et al. does not suggest these additional features. The dependent claims are therefore patentable over Sherman et al. for these additional reasons.

Regarding claim 11, the Examiner additionally applies Benndorf as allegedly teaching storing a "capacitance frequency" in memory. First, claim 11 recites that the capacitance at an off-resonance frequency is stored in memory, and not a "capacitance frequency" as asserted by the Examiner. Also, Benndorf does not teach or suggest storing a capacitance in memory, as asserted by the Examiner. Benndorf teaches storing current values. See for example, col. 2, lines 45 and 50. Thus, claim 11 is patentable over the applied references for this additional reason.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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